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UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF BIOLOGICAL SURVEY

PROPAGATION OF WILD DUCKS

The following directions are chiefly compiled from accounts of experienced breeders, which may be consulted in greater detail in the publications listed at the end of this circular.

PERMITS

No wild ducks may be captured, confined, bought, sold, or shipped for propagating purposes without permit from the United States Department of Agriculture. Application for such permits should be addressed to the Biological Survey. Many States also require permits to be taken out for the propagation of wildfowl and in States so doing both State and Federal permits are necessary. Addresses of State officials from whom permits can be obtained may be had by addressing the Biological Survey. The laws of some States do not permit propagation of wildfowl; a summary of all State game laws may be obtained from the Biological Survey.

SITES

A lake or pond, preferably not more than three acres in extent, and fed by running water, is the basis of a duck-rearing establishment. It is well to have twice as much area in marsh as in water; marsh may be artificially established as noted in planting directions farther on. If lacking natural shelter against cold winds, either a high bank should be built on the proper side, or dense shrubbery, preferably evergreen, should be planted, or both. To prevent escape of breeding stock and to keep out natural enemies it is advisable to inclose the pond and all adjoining land to be used with woven fire fence. The best fence is of half-inch mesh, the bottom strip buried in the ground 9 inches and turned out 9 inches, 8 feet high above ground, with outwardly projecting overhang a foot wide, supported on brackets from each post and hanging down 6 inches at the outer edge. This is the ideal, but expensive fence, and many content themselves with something cheaper. The fence should be at a good distance from the water at all points and should be screened with shrubbery or vines to prevent the birds being disturbed by occurrences outside the inclosure.

WINTER SHELTER

Shelter for the birds in severe winter weather is desirable in most places and essential in the north. Where only occasionally needed it may consist of low, thatched hutches with dry litter under them on the ground. They should be closed on three sides to keep out snow, and the birds may be trained to use them by having feed scattered in them. Where severe winter weather is the rule, a tight house with plenty of dry litter on the floor should be provided; the birds may be driven in at night and soon trained to resort there.

NESTING SITES

Marsh, islands, and shore covered with vegetation furnish nesting sites for most ducks. Their improvement is considered under the next section, on PLANTING. Islands are much patronized by ducks, and if not naturally present, may be artificially provided. The ducks seem to appreciate the security they afford. Even floating but securely anchored platforms covered with earth and coarse litter, as cornstalks, are accepted as nesting sites. Wood ducks and a few other species which naturally nest in holes in trees will use nest boxes. These may be placed on posts in the water or on islands. Each should have an inside space measuring about a foot in each dimension, with an opening 4 by 4 $\frac{1}{4}$ inches in one side near the top. The roof should be sloping, project well beyond the sides, and be hinged to permit access to the interior. A cleated walk leading by easy grade to the entrance should be provided.

PLANTING

Planting is of importance in relation to the vital needs of shelter, nesting sites, and food. Fences may be covered with Japanese honeysuckle, bittersweet, or woodbine, or may be screened with hemlock or arbor-vitae; the latter are excellent also for a wind-break along shore. Marsh valuable for summer shelter and nesting sites can be made by planting cat-tails, but plants producing some duck food should be preferred, as bulrushes, other sedges, wild rice, wild millet, and other grasses. Cover for nests on shore can be furnished by any tall grasses and weeds but low shrubs are more desirable, as broom and wax myrtle. It is impracticable to stock with food plants a pond constantly frequented by large numbers of ducks. Something may be done, however, with a lake of considerable area. For particulars as to plants adapted to various conditions and methods of propagating them, consult bulletins on wild-duck foods issued by the Biological Survey. These and a list of dealers in the plants may be obtained by application to the Survey. Green food or natural roughage is a great desideratum on a duck farm, and a good way to supply it is by providing a system of unit ponds, in other words a canal or broad ditch divided into compartments, in some of which plants can be growing under screen while the ducks are allowed to feed in the others. The best plants for such ponds are water-cress, waterweed, coontail, and muskgrass.

BREEDING STOCK

The wild duck most easily handled and therefore most frequently kept on duck farms is the mallard. The closely related black duck is more high-strung and shy, needs more space, and does not do well if disturbed. The wood duck is not especially difficult to handle, except that the young ducklings are great climbers, and on that account need special treatment. This species requires nest-boxes, described in a previous paragraph, on NESTING SITES. Little success has been had with other species, and their culture is in the experimental stage. In all cases it should be remembered that new blood must constantly be added if the wild conformation of the birds is to be kept. Duck propagators should remember also that not all birds will breed during the first year of life or of captivity.

Breeding stock of whatever species should be obtained in fall so as to be settled in its quarters before the breeding season which comes rather early in spring. Birds received after a long trip should not be allowed to

visit the pond, as their plumage will not be oiled and in good order and they will get watersoaked. If feathers of newly arrived ducks seem to be dirty, give the birds a pan of tepid water on a sunshiny morning; when they have again got their plumage in good order they may be liberated to visit the water. Feed the birds with especially nourishing food until they recover from the hardships of travel.

Stock purchased from dealers will arrive either pinioned or wings clipped and it is necessary to perform one or the other of these operations on all birds intended to be kept as breeding stock. Wing-clipping simply means shearing off the principal flight feathers, or primaries, and it is necessary to repeat the operation, at least annually, after the regular molt in midsummer. Pinioning means cutting off the last section (the fingers) of the wing to which the long flight feathers are attached. Directions for this operation are contained in the next paragraph.

PINIONING

To pinion an adult bird, raise the thumb of the wing (at base of last joint) and tie a cord tightly around the last joint well up under the thumb. Have ready some tannic acid which is in powder form. With a pair of stout sharp shears or scissors clip off the joint close below the cord, removing all or nearly all of the long flight feathers or primary quills. At once take a pinch of tannic acid and press it firmly into the wound to check bleeding. The cord should be removed a few days later when the wound is healing. Pinioning ducklings is very simple. Operate when the birds are 4 to 7 days old, if in good condition, simply snipping off the last joint and dipping the stump into tannic acid.

FEEDING ADULTS

The staple food for adult wild ducks in confinement is mixed small grains, as wheat, barley, buckwheat, scratch feeds, and mill wastes. A mixture of weed seeds and broken rice, which can be obtained from rice mills, has been used with satisfactory results, and waste from other types of mills no doubt will serve. Not much whole corn is fed, as a rule, and that chiefly in winter. When the weather permits, scatter the food in water, as this gives the birds their natural feeding conditions and leaves no food where it is likely to attract rats. With proper feeding, however, little or no food should be left over. Forcing foods are universally used for some time prior to and during the breeding season; the same rich foods also are often used in winter and in special cases for birds weakened by exposure or other cause. The special rich foods are given in the form of a scalded mash, the bulk of which may consist of alfalfa meal, ground corn or oats, with a liberal addition of beef or fish scrap. Feed them only crumbly moist and no more in quantity than the birds will consume at once. The same mixture, dry, however, may be kept available to the birds throughout the breeding season, putting it in a trough sheltered from rain. Good results have been obtained also by using chopped fresh fish or live minnows as a forcing food. Roughage is very desirable at all times, the best being aquatic plants, which may be grown in sufficient quantities in the pond most frequented by the birds if it is large enough; otherwise the system of unit ponds described under PLANTING may be used. Aquatic plants may also be gathered from any convenient source and thrown in the feeding pond. In the total absence of such plants, chopped-

up grass, weeds, lettuce, beets, etc. may be used. Plenty of coarse, sharp grit should always be accessible to the birds, and it is well also to keep before them a mixture of ground-up cyster shells and charcoal.

PRODUCTION AND CARE OF EGGS

Eggs are sometimes purchased when starting duck breeding, but they do not always bear shipment well. The best results appear to be obtained from hatching the eggs of a well-acclimated stock of adult breeding birds. Wild ducks lay early and it is necessary to be prepared to care for the eggs in March and April. When the eggs are collected regularly, mallards will lay, on the average, from 25 to 40 eggs each breeding season. In all cases take at least the first setting of eggs, and of mallards the second and set at once if possible. If taken perfectly fresh, the eggs may be kept one or two weeks. Set them on end in bran in a cool place and turn daily. Eggs are usually set under small hens or bantams, 12 eggs to the setting for hens, and 8 for bantams. Setting boxes may be built in tiers and a great many put in a small space. Make the bottom of nest of turf, hollowed out by scraping off some of the dirt underneath the middle. See that the setting boxes are free from vermin; spraying or painting them with preparations containing carbolic acid or creosote will accomplish this. Prepare the hen by dusting her feathers well with pyrethrum powder, repeated if lice appear. Test the hen's intention to incubate by keeping her on china eggs two days. Food, water, and exercise are given the brooding hens once a day, mornings preferred. Fouled nests should be cleaned at once and broken eggs removed; wash in tepid water any eggs fouled by the contents of a broken one, and make a new nest of turf. Duck eggs require considerable moisture, and the turf helps in this respect; the eggs should also be sprinkled daily with tepid water. When incubators are to be used larger numbers of eggs should be accumulated. The incubator should be run at a temperature of 103 degrees, carried to 104 degrees during hatching. The eggs should be turned, aired, and sprinkled daily with tepid water and the air in the incubator should be kept moist by the evaporation of a never-failing water supply. Incubators are sometimes used to hatch eggs incubated under hens to prevent loss of ducklings by trampling.

CARE OF YOUNG

Young hatched in incubators, as soon as dry, should be put under broody hens that they may learn to nestle before being placed on the rearing field. When young are hatching under a hen disturb as little as possible, but egg shells should be removed with care. Small coops with bottomless runs attached are used to house the hens and broods. Half-inch wire mesh is necessary to confine small ducklings, which must not be allowed to run in wet grass and get chilled. The runs should be covered also with wire netting and either set in partial shade or provided with a screen (small home-made tables are good) against strong, direct rays of the sun, exposure to which will quickly kill the young birds. Runs should be shifted frequently to fresh ground. After the ducklings are a week old they may have larger runs, 8 feet square or more, which should be shifted at least once a week. As an alternative, the use of small coops may be continued, they being set inside a larger fenced-in yard and the ducklings allowed free range of the place. By this time they will

have learned the hen's call and return to her for brooding and for the night. Contrary to popular impression, ducklings do best if kept away from water until their bodies are well feathered, say when they are about eight weeks old. At earlier stages whenever their plumage begins to be fouled let them bathe in pans of shallow water for a short time on warm, bright mornings. In the larger inclosure just described they may be given water, also feed, in shallow troughs, 3 inches deep, 6 inches wide, and 8 to 10 feet long. Wood ducks and all deep-water ducks seem to do better if allowed freer access to water. It may be furnished safely in a good-sized baking pan lined with green turf which then is barely covered with water. This prevents the ducklings from getting their backs wet and gives them employment probing mud and nibbling grass. When such ducklings are large enough to be given access to deeper water they should not be allowed to stay in it very long at first, and at no time to remain in it during cold weather or at night, and get chilled. A commodious pen with a corner extending into a pond is suitable for this stage of duckling growth.

At 8 weeks of age all ducklings can be allowed to run together, a warm morning being chosen, for their introduction to the pond where they are to mature. For the first few days they should not be allowed to stay in too long, but should be driven into the dry compartment of an inclosure consisting of a wire cage in the water and a shed on shore. This should be their permanent feeding and roosting place and here they can be penned whenever wanted.

FEEDING DUCKLINGS

Fine grit, mixed with a little ground charcoal, should be before ducklings from the very first, also water in drinking fonts in which they can dip only their bills. The first feeding when they are a day old may be finely ground hard-boiled egg mixed with cracker crumbs or rolled oats, just crumbly moist, and a little sand. The foster mother should be fed with grain to prevent her taking all the ducklings' food. To accomplish the same end, as soon as the ducklings have learned to eat it is better to feed them outside the coop. Feeding at first should be in small quantity, but often, say five times a day. In a few days the meals can be cut down to four. After the first day a good feed is three parts oatmeal and one part duck-meal, scalded and fed only crumbly moist. Sprinkle in this somewhat less than a tenth its bulk of coarse sharp sand and about a quarter by bulk of hard-boiled eggs, ground up shell and all. After one week the base of the food may be varied with barley meal, bran, and middlings. Continue this a week then gradually reduce the egg until at 3 weeks none is given. At this time add good beef scrap until it forms 10 to 15 per cent of the food, and begin giving in the mash small mixed grains, which can be increased in quantity and size as the ducklings grow. Little corn is given until the birds are practically grown. Abundant chopped green food, as grass, lettuce, rape, etc., should be given from the first. Nothing is better than water plants. Special methods for the delicate or unusual species of ducks can not be given in a circular of this kind. For instructions along this line consult H. K. Job's "The Propagation of Wild Birds."

KEEPING FULL-FLIGHTED BIRDS

It is important to remember that ducks, wild to all intents and purposes, except that they return to their home preserve to feed and roost, can be maintained on game farms. The best native species for propagation are the mallard, black duck, and wood duck, and the most desirable locations for attempting this type of duck culture are the larger estates having a number of well separated lakes or ponds. In producing these practically wild birds the wings of the desired number of young are allowed to make their normal growth, and the birds are accustomed to regular feeding times in a covered wire enclosure, which can be shut when desired and from which the birds can be driven to a shed. With this arrangement they can be captured whenever wanted for releasing in drives or for pinioning for breeders. This system is valuable for use in colonizing wild ducks in any area, as the free birds, even if they migrate, return and establish a wild breeding stock.

PRECAUTIONS AGAINST DISEASE

1. Never place young ducks where there is not an abundance of shade right at hand. Adults need shade also, but they are not so susceptible to the sun's rays as ducklings.
2. Do not overcrowd.
3. See to it that young and old always have a perfectly dry place both for sleeping and for retreat in the daytime.
4. Do not expose to the sun the drinking water given young ducks.
5. Remove all food not eaten by ducklings.
6. Segregate sick birds at once.
7. Burn the bodies of all birds that die of disease and spade and quicklime the pen in which they have been confined.

ENEMIES OF CAPTIVE WILD DUCKS

Undoubtedly, the worst enemies of young ducklings are cats and rats. Cats are sly robbers, hard to detect, and their abundance in a semiwild state is increasing yearly. All wandering cats should be killed. Rats are determined and bloodthirsty vermin, and often they work for some time before their depredations are discovered. Cats, rats, minks, and weasels must be kept down by means of traps, guns, and poison if necessary.

Crows will greedily take small ducklings, and eggs; and the sharp-shinned and Cooper hawks are ever ready to carry off the young birds. Snapping turtles and such fish as pike, pickerel, and bass, if allowed to live in a duck pond, will seize and devour a great many ducklings and even attack the adult birds. All such aquatic scourges must be carefully kept out of duck-ponds.

RECENT PUBLICATIONS ON THE PROPAGATION OF WILD DUCKS

HORNADAY, W. T., and Lee S. CRANDALL.

Breeding mallard ducks for profit,

New York State Conservation Department, Albany. 1912. Free.

HUNTINGTON, D. W.

Our wild fowl and waders.

Amateur Sportsman Co., New York City. 1910. \$2.00;

JOB, H. K.

The propagation of wild birds.

Published by National Association of Audubon Societies,
1974 Broadway, New York City. 1915. \$2.15;

QUARLES, E. A.

The mallard: its breeding, shooting, and preserving. 1916. 25 cent

The breeding of the beautiful wood duck. 1916. 25 cents.

Published by The American Game Protective Association,
233 Broadway, New York City.

